Figure 10b. Rotational landslide, Golden, Colorado (photograph by Colorado Geological Survey).

distances if conditions are right. Slide material may range from loose unconsolidated soils to extensive slabs of rock.

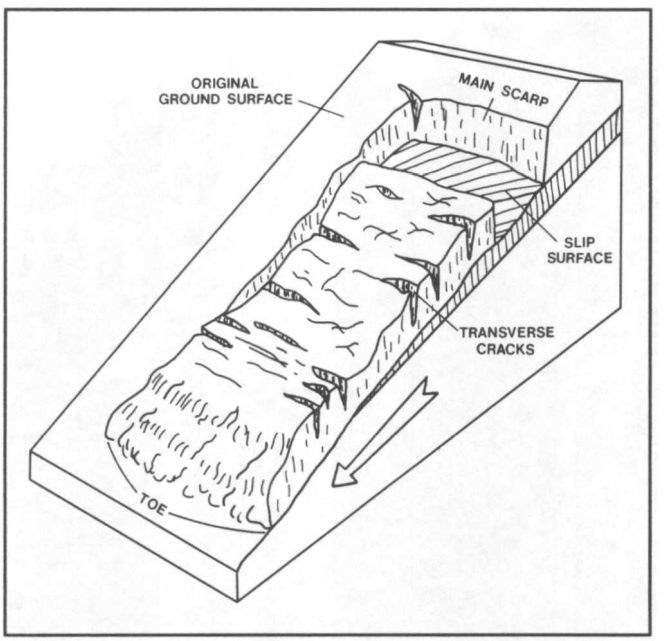

Figure 11. Translational slide (Colorado Geological Survey et al., 1988).

Block Slide. A block slide is a translational slide in which the moving mass consists of a single unit, or a few closely related units that move downslope as a single unit (Figure 12).

Lateral Spreads

Lateral spreads (Figures 13a, b) are a result of the nearly horizontal movement of geologic materials and are distinctive because they usually occur on very gentle slopes. The failure is caused by liquefaction, the process whereby saturated, loose, cohesionless sediments (usually sands and silts) are transformed from a solid into a liquefied state; or plastic flow of subjacent material. Failure is usually triggered by rapid ground motion such as that experienced during an earthquake, or by slow chemcal changes in the pore water and mineral constituents.

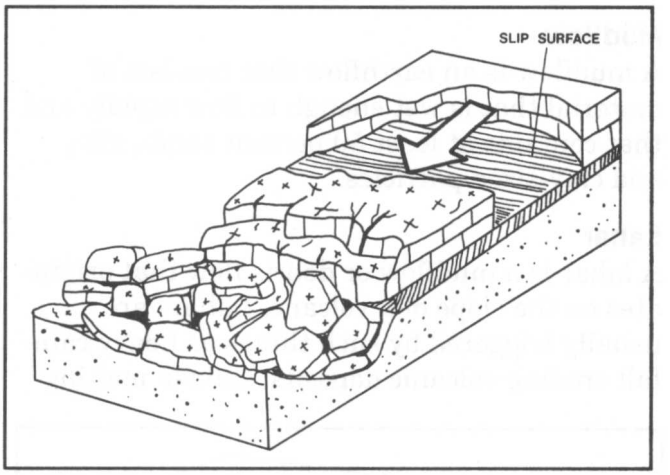

Figure 12 . Block slide (Colorado Geological Survey et al., 1988).

Flows

Creep

Creep is the imperceptibly slow, steady downward movement of slope-forming soil or rock. Creep is indicated by curved tree trunks, bent fences or retaining walls, tilted poles or fences, and small soil ripples or terracettes (Figures 14a, b).

Debris flow

A debris flow is a form of rapid mass movement in which loose soils, rocks, and organic matter combine with entrained air and water to form a slurry that then flows downslope. Debris-flow areas are usually associated with steep gullies. Individual debris-flow areas can usually be identified by the presence of debris fans at the termini of the drainage basins (Figure 15).

Debris avalanche

A debris avalanche is a variety of very rapid to extremely rapid debris flow.

Earthflow

Earthflows have a characteristic "hourglass" shape (Figures 16a, b). A bowl or depression forms at the head where the unstable material collects and flows out. The central area is narrow and usually becomes wider as it reaches the valley floor. Flows generally occur in fine-grained materials or clay-bearing rocks on moderate slopes and with saturated conditions. However, dry flows of granular material are also possible.

Mudflow

A mudflow is an earthflow that consists of material that is wet enough to flow rapidly and that contains at least 50 percent sand-, silt-, and clay-sized particles.

Lahar

A lahar is a mudflow or debris flow that originates on the slope of a volcano. Lahars are usually triggered by such things as heavy rainfall eroding volcanic deposits; sudden melting of snow and ice due to heat from volcanic vents; or by the breakout of water from glaciers, crater lakes, or lakes dammed by volcanic eruptions.

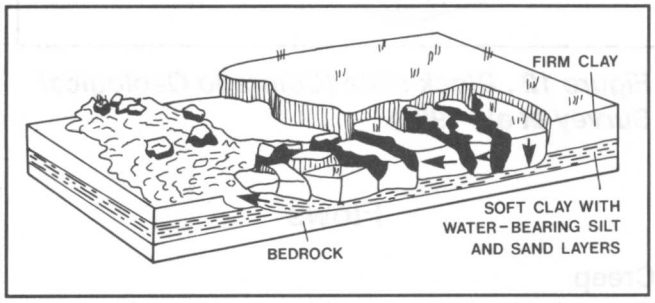

Figure 13a. Lateral spread (Colorado Geological Survey et al., 1988).

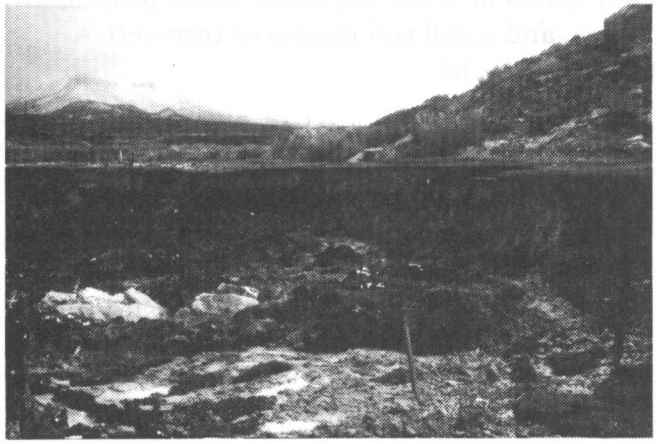

Figure 13b. Lateral spread, Cortez, Colorado. (Photograph by Colorado Geological Survey).

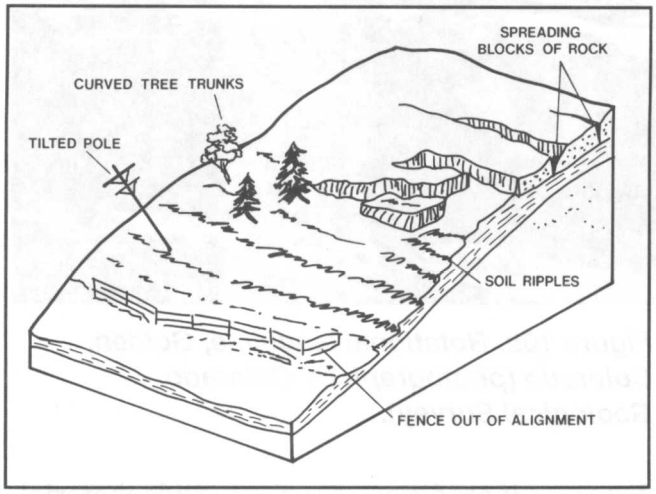

Figure 14a. Creep (Colorado Geological Survey et al., 1988).

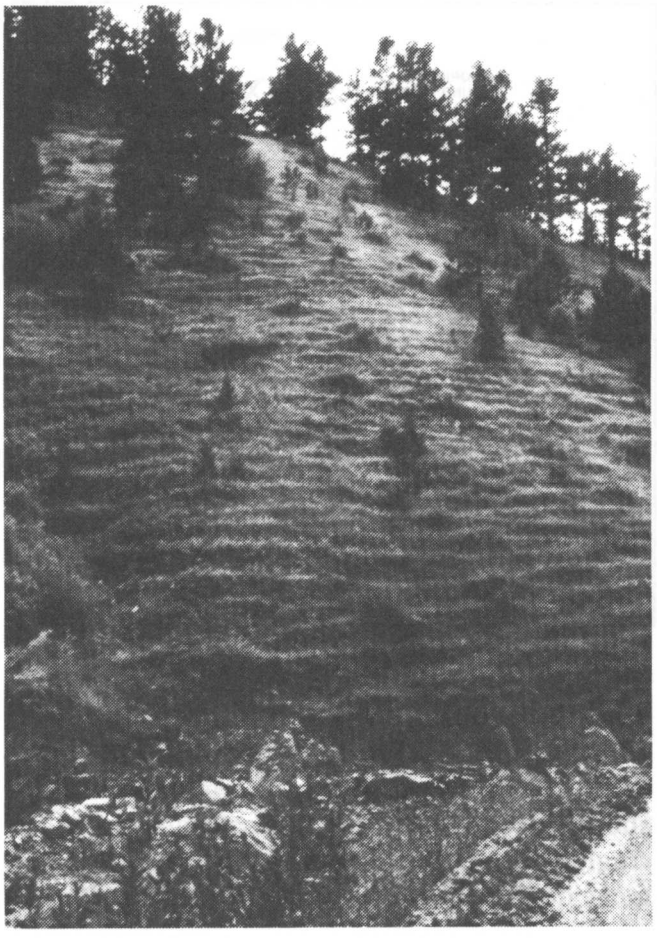

Figure 14b. Creep, vicinity of Mt. Vernon Canyon, Jefferson County, Colorado (photograph by Colorado Geological Survey).